DEVICE AND METHOD FOR WASHING MACHINE

[Technical Field]

The present invention relates to washing apparatuses and washing methods, and more particularly, to a washing apparatus of a new structure, which can make automatic sensing of each piece of laundry introduced to an inside of a drum, and additional automatic setting of operation for pieces of laundry unable to make the automatic sensing, and a washing method thereof.

Moreover, the present invention relates to a washing apparatus of a new structure, which can make a user to know properties of a piece of laundry introduced to an inside of a drum in advance, so that a wrong washing is prevented in advance, and a washing method thereof.

[Background Art]

In general, in the washing apparatuses, there are pulsator type washing machines each having a vertical drum, drum type washing machines each having a drum laid down in a horizontal direction, and washing and drying machines each having a drying function.

The washing apparatus performs washing by determining an amount of laundry introduced to the drum, and setting a washing water level and a washing time period automatically according to the amount of laundry.

Recently, owing to development of information technology, a RFID (Radio Frequency Identification) Tag is attached to a portion of clothes for making management of logistics or management of information possible.

The RFID tag has a predetermined memory region for enabling memory of various kinds of information on the clothes. The memory region has various kinds of information recorded thereon, or is a kind of memory chip for enabling recording of additional information.

Particularly, Korean Registered Patent Publication No. P1995-0011598 discloses a washing information input device provided with an information medium attached to clothes, having information on washing recorded thereon, washing information input sensing means mounted to an appropriate place of a body of a washing machine for sensing the washing information on the information media, and system control means for controlling entire system operation of the washing machine by using the washing information sensed at the washing information input sensing means.

That is, the Korean Registered Patent Publication No. P1995-0011598 enables to obtain information on washing from the information media attached to clothes and to perform an appropriate washing according to the information on washing.

Moreover, Japanese Laid Open Patent No. 2002-360968 discloses a washing apparatus in which a noncontact identification device is used, provided with a reader for receiving a signal from the RFID tag to be attached to clothes and having information recorded thereon, a central information processing unit having a holder for informing information the reader reads, and a control unit for setting or changing a washing mode.

That is, the Japanese Laid Open Patent No. 2002-360968 intends to obtain information on washing from the RFID tag attached to the clothes at the time of washing, for preventing setting of an improper washing.

However, the related arts have a problem in that obtaining information from pieces of laundry having no information tag, such as a bar code, or a RFID tag, is impossible.

That is, because the related arts can not obtain information from pieces of clothes having no information tags, resulting in left out of information on the pieces of laundry, exact setting of operation of each cycle is failed.

For an example, in general, even though washing water levels or operation time periods, or the like for performing operation of each cycle vary with amounts of laundry substantially, if there is left out of information on a plurality of pieces of laundry, setting error

on the washing water levels, or operation time periods, obtaining an optimum washing effect will be failed, at the end.

Moreover, if various kinds of pieces of laundry are introduced to the inside of the drum, the related arts merely inform that washing is not possible, but fail to provide information on properties of the pieces of laundry, and more detailed information on a washing performance.

That is, since the related arts fail to lead a user to pay attention to matters to be attended to caused by properties of each piece of clothes, in a position of the user who is merely informed that washing is not possible, a countermeasure required for performing washing can not be made, smoothly.

[Disclosure]

[Technical Problem]

An object of the present invention is to provide new washing apparatus and washing method, which can make automatic sensing, and washing of each piece of laundry introduced to an inside of a drum, and make automatic setting of a washing method even taking information on pieces of laundry unable to make the automatic sensing into account.

Another object of the present invention is to provide new washing apparatus and washing method, which can make a user to know properties of pieces of laundry in advance, for preventing wrong washing in advance.

[Technical Solution]

The objects of the present invention can be achieved by providing a washing apparatus including a body having a drum and driving units for driving the drum, a reader unit for receiving a signal from an information tag on each piece of laundry introduced to an inside of the drum, to obtain information stored in the information tags, a display unit for displaying various kinds of information obtained by the reader unit, an interface unit for providing an input environment for having various particulars selected by the user, or

receiving additional information from the user, and a control unit for receiving information obtained by the reader unit, and information provided to the interface unit, setting operation of various kinds of cycles by using the information received thus, and controlling the driving units with reference to the setting, for performing washing.

In another aspect of the present invention, a washing method includes an information obtaining step for obtaining information on washing of pieces of laundry from information tags respectively of entire laundry introduced to an inside of a drum, an information determining step for displaying information on particulars of the pieces of laundry in the information obtained thus, and requesting the user to determine whether the particulars displayed thus is the same with particulars of laundry having the user introduced thereto actually, or not, an information revising step for receiving revised particulars of the pieces of laundry which are not same from the user in a case particulars of the pieces of laundry responded on the request are not the same with each other, and an operation setting step for setting operation of each cycle with reference to the revised particulars, and the information on washing of the pieces of laundry obtained thus.

In another aspect of the present invention, a washing apparatus includes a reader unit for receiving a signal from an information tag on each piece of laundry, to obtain information on properties of each piece of laundry stored in the information tags, a display unit for displaying various kinds of information, and a control unit for receiving information on properties of the piece of laundry from the reader unit, retrieving information on matters to be attended to in washing according to the properties of the piece of laundry or recommendable information on setting of operation in washing with reference to the information received thus, and giving a notice on the information retrieved thus to the user through a display unit.

In another aspect of the present invention, a control method includes an information obtaining step for obtaining information on properties of each piece of laundry from an information tag on the piece of laundry introduced to an inside of a drum by using a reader

unit, an information retrieving step for retrieving information to be attended to in washing from the information on properties obtained thus, and a noticing step for giving a notice on the information retrieved thus to a user.

In further aspect of the present invention, a control method includes an information obtaining step for obtaining information on properties of each piece of laundry from an information tag on the piece of laundry introduced to an inside of a drum by using a reader unit, an information retrieving step for retrieving recommendable information on setting operation of each cycle from the information on properties obtained thus, and a noticing step for giving a notice on the information retrieved thus to a user.

[Advantageous Effects]

The washing apparatus and washing method in accordance with one aspect of the present invention permits automatic setting of various cycles for washing by determining kinds of pieces of laundry by a non-contact method.

The washing apparatus and washing method in accordance with one aspect of the present invention permits exact setting of operation of each cycle because the washing apparatus and washing method is operated such that a difference between laundry introduced actually and laundry sensed is determined by the user personally even if a piece of laundry of which sensing is not possible is introduced.

The washing apparatus and washing method in accordance with another aspect of the present invention permits to prevent wrong washing in advance because information to be attended to in washing, or recommendable information on setting washing cycles of laundry, is provided to the user according to properties of laundry intended to wash.

The washing apparatus and washing method in accordance with another aspect of the present invention permits to improve satisfaction of the user on a result of washing because the washing can be made in a state an intention of the user is added thereto.

[Description of Drawings]

FIG. 1 illustrates a block diagram of a washing apparatus in accordance with a first preferred embodiment of the present invention, schematically;

FIG. 2 illustrates a flow chart showing the steps of a washing method in accordance with a first preferred embodiment of the present invention;

FIG. 3 illustrates a flow chart showing an example of the steps of a process for automatic setting of operation in the washing method in accordance with the first preferred embodiment of the present invention;

FIG. 4 illustrates a block diagram of a washing apparatus in accordance with a second preferred embodiment of the present invention, schematically;

FIG. 5 illustrates a flow chart showing the steps of a washing method in accordance with a second preferred embodiment of the present invention; and

FIG. 6 illustrates a flow chart showing the steps of a washing method in accordance with a third preferred embodiment of the present invention.

[Best Mode]

Embodiments of the present invention will be described in detail with reference to the attached drawings.

FIG. 1 illustrates a block diagram of a washing apparatus in accordance with a first preferred embodiment of the present invention.

The washing apparatus in accordance with the first preferred embodiment of the present invention includes a body 110, a drum 120, a driving unit 130, a reader unit 140, a display unit 150, an interface unit 160, and a control unit 170.

The body 110 forms an exterior of the washing apparatus.

The drum 120 is mounted in the body 110, and driven by the driving unit 130.

The driving unit 130 includes a driving motor (not shown) for driving the drum 120, and a water supply valve (not shown) for controlling water supply.

The reader unit 140 exchanges signals with an information tag 210 attached to each

piece of laundry introduced to an inside of the drum 120 to obtain information from the information tag 210.

It is preferable that the information tag 210 attached to each piece of laundry has information on washing of the piece of laundry stored therein.

It is preferable that the information tag 210 is a RFID (Radio Frequency Identification) tag additional information may be written thereon, and the reader unit 140 is a RFID reader which exchanges a signal with the RFID tag to receive information from the RFID tag, or to write new information on the RFID tag.

Of course, the information tag 210 may have a bar code, and the reader unit 140 may be a bar code reader, or one of other various structures which can exchange information by other noncontact method.

Moreover, the information on washing stored in the information tag 210 on each piece of laundry includes at least one of a weight of the piece of laundry, a washing water temperature for preferable operation of each cycle, a time period for each cycle, a washing water level, and detergent to be used.

The display unit 150 receives, and displays information from the reader unit 140.

The display unit 150 may be an LCD, or other display device.

The interface unit 160 is provided for exchange of information between the user and the washing apparatus. The interface unit 160 provides an input environment for having various particulars selected by the user, or receiving additional information from the user. The interface unit 160 may be a general key pad, or the like.

The control unit 170 controls driving of various driving units 130 of the washing apparatus.

Particularly, it is preferable that the control unit 170 is connected to the reader unit 140 so as to be able to exchange information for receiving information on all the pieces of laundry from the reader unit 140.

It is preferable that the control unit 170 has software programmed therein for setting operation of each cycle for washing the piece of laundry with reference to the information from the reader unit 140.

A washing method by using the foregoing washing apparatus will be described with reference to the flow charts in FIGS. 2 and 3 attached hereto.

The user introduces a plurality of pieces of laundry to an inside of the drum 120.

In this instance, the reader unit 140 obtains information on washing the pieces of laundry from the information tags 210 on the pieces of laundry introduced thus (S110).

The information on washing includes at least one of weights of the pieces of laundry, and washing water temperatures for performing preferable operation of each cycle.

Along with this, the control unit 170 receives the information from the reader unit 140, and displays the information on the display unit 150 for user's notice (S120).

That is, the control unit 170 makes the user to compare particulars of the pieces of laundry introduced to an inside of the drum 120 actually to particulars of pieces of laundry displayed thus.

Moreover, in the step for controlling to display the information, the control unit 170 requests the user to confirm whether the particulars of pieces of laundry displayed thus and the particulars of the pieces of laundry introduced to an inside of the drum 120 actually are the same, or not (S130).

In this instance, for requesting the user to make confirmation of the particulars of the laundry the same or not, it is preferable that the control unit 170 requests the user to select a specific button for confirmation of the particulars of the laundry the same or not. Of course, the request for making confirmation of the particulars of the laundry the same or not may be made by other methods not described herein.

When the user responses to the request, the control unit 170 determines whether the particulars of pieces of laundry displayed thus and the particulars of the pieces of laundry

introduced thus actually are the same, or not through description of the response.

The particulars may not be the same because at least one of the pieces of laundry has no information tag 210, or a sensing error is caused at the reader unit 140.

If it is determined that the particulars are the same, the control unit 170 sets operation of each cycle with reference to the information only from the reader unit 140 (S140).

In the setting of operation of each cycle, at least one of a washing water temperature, and a washing water level for a weight of entire laundry is set for operation of each cycle.

Opposite to this, if it is determined that the particulars are not the same (for an example, if a piece of laundry having no information tag 210 is introduced), the control unit 170 sets operation of each cycle with reference to revised information after revising the particulars which are not the same (S150).

In this instance, it is preferable that, once the user revises the particulars which are not the same, the control unit 170 sets the operation of each cycle automatically with reference to the revised particulars.

A process for automatic setting of operation will be described in more detail with reference to FIG. 3 attached hereto.

The control unit 170 requests the user to revise particulars of the laundry which are not the same through the display unit 150 (S151).

The revision of particulars which are not the same is revision of a difference between a number of pieces of laundry for each particular introduced to an inside of the drum 120 actually and a number of pieces of laundry for each particular sensed at the reader unit 140. The revision is made through the interface unit 160.

Once the user revises the difference of numbers of pieces of laundry for each particular, the control unit 170 determines, and stores an amount of clothes for the number of pieces of laundry for each particular revised thus (S152).

Though the determination of amount of clothes may be made by determining a

weight of pieces of laundry of the same kind in information on washing obtained from laundry of the same particulars, because, in general, in most of cases pieces of laundry of which sensing is left out have no information tags 210, it is preferable that the determination of amount of clothes is made by receiving information on an approx. weight of the laundry from the user.

Of course, the setting can be made such that the determination of an amount of clothes for entire laundry in the drum is made by a physical method, even if the user only performs selection on a not-the-same button simply, without providing the information thereto, personally.

That is, by determining a load on a driving unit by driving the driving unit, the weight of the entire laundry can be determined, or a separate weight sensor may be provided for measuring the weight of entire laundry in the drum.

Then, the weight of entire laundry introduced to inside of the drum 120 can be determined with reference to the information on the amount of laundry determined additionally (S153).

Along with this, operation of each cycle is set with reference to the information on weight of entire laundry (S154).

That is, washing levels of respective cycles, such as a washing water level in washing, a washing water level in rinsing, and so on are set with reference to the information on weight of entire laundry, and temperatures of washing water for performing operation of respective cycles are set with reference to the information on washing.

Of course, it is preferable that the information on washing other pieces of laundry determined through the reader unit 140 is referred to at the time of setting the operation of each cycle.

Then, the control unit 170 controls the driving unit 130 with reference to the information on operation of each cycle set thus, to perform each cycle (S160).

At the end, the series of steps in accordance with a preferred embodiment of the present invention permits automatic sensing, and automatic setting of operation of pieces of laundry even taking pieces of laundry of which automatic sensing is impossible into account.

In the meantime, a second preferred embodiment of the present invention suggests providing user with matters on laundry to be attended to in washing, or recommendable information on setting of operation in washing.

It is the most preferable that services of the second preferred embodiment of the present invention are preformed in a state particulars (amount, or weight, or so on) of each piece of laundry are determined exactly by the method of the first embodiment of the present invention. Of course, the services of the second preferred embodiment of the present invention may be preformed separate from the first embodiment.

A structure of a washing apparatus in accordance with a second preferred embodiment of the present invention, and a washing method by using the same will be described in more detail with reference to FIGS. 4 to 6.

FIG. 4 illustrates a block diagram of a washing apparatus in accordance with a second preferred embodiment of the present invention.

The washing apparatus in accordance with the second preferred embodiment of the present invention includes a body 310, a drum 320, a driving unit 330, a reader unit 340, a display unit 350, and a control unit 370.

The body 310 forms an exterior of the washing apparatus.

The drum 320 is mounted in the body 310, and driven by the driving unit 330.

The reader unit 340 obtains information from an information tag 210 attached to each piece of laundry.

The information tag 210 attached to each piece of laundry has information on properties of each piece of laundry stored therein, and is able to transmit information, and store new information through transmission/reception of a signal to/from the reader unit 340.

It is preferable that the information tag 210 is a RFID (Radio Frequency Identification) tag additional information may be written thereon, and the reader unit 340 is a RFID reader which exchanges a signal with the RFID tag to receive information from the RFID tag, or to write new information on the RFID tag.

Of course, the information tag 210 may have a bar code, and the reader unit 340 may be a bar code reader, or one of other various structures which can exchange information by other noncontact methods.

The display unit 350 displays various kinds of information following progress of cycles of the washing apparatus.

The display unit 350 may be an LCD, or other display device

It is preferable that the control unit 370 is a controller which controls each driving unit 330 of the washing apparatus.

In a case information on properties of a particular laundry is received from the reader unit 340, it is preferable that the control unit 370 retrieves matters to be attended to according to properties of the piece of laundry or recommendable information on control of performing washing, and informs to the user.

The present invention is characterized in that a memory 380 is further included for storing various information, and sharing information with the control unit 370.

The memory 380 is operated to retrieve information to be attended to in washing, or recommendable information on setting of operation of washing.

A washing method by using the foregoing washing apparatus will be described in more detail.

FIG. 5 illustrates a flow chart showing the steps of a washing method in accordance with a second preferred embodiment of the present invention, referring to which the washing method in accordance with a second preferred embodiment of the present invention will be described.

When the user introduces a plurality of pieces of laundry to an inside of the drum 120, the control unit 370 controls the reader unit 340 to obtain information on properties of the pieces of laundry from the information tags 210 on the pieces of laundry introduced thus (S210).

The reader unit 340 of a RF reader exchanges signal with the information tag 210 of a RFID tag, to obtain information on properties of the piece of laundry stored in the information tag.

Particularly, the information on properties obtained thus is on material (for an example, composition of fiber) of the piece of laundry.

Of course, if the information tag 210 has information on a cycle temperature, information on usable detergent, or information whether a bleaching agent can be used or not further stored therein, it is preferable that above information is also obtained.

Upon finishing obtaining information on properties of a particular piece of laundry introduced to the drum 320, the control unit 370 retrieves information to be attended to from the information on properties obtained thus (S220).

The information to be attended to in washing is kinds of detergent which should not be used, or a temperature range which should be avoided in performing operation of each cycle.

The retrieval of the information is made by obtaining information stored in a state to be in correspondence to properties of a relevant piece of laundry among information on properties of each piece of laundry to be attended to in washing stored in the memory 380.

For an example, if the piece of laundry is formed of protein fiber (wool, silk, and so on), information to be attended to in washing protein fiber is obtained from various kinds of information stored in the memory 380, for an example, chlorine group of bleaching agent should not be used.

If the piece of laundry is formed of acetate material (diacetate, triacetate, and so on),

information to be attended to in washing acetate material, for an example, strong bleaching agent should not be used, is obtained.

If the piece of laundry is formed of cellulose fiber (cotton, hemp and so on), information to be attended to in washing cellulose fiber, for an example, washing at a high temperature should not be used and so on, is obtained.

Upon finishing retrieval of particulars to be attended to in washing by above series of steps, the information retrieved thus is displayed on the display unit 350 as data for giving a notice to the user (S230).

At the end, the user becomes to know matters to be attended to in washing the laundry in advance before the washing is performed actually by the foregoing series of steps in accordance with the second preferred embodiment of the present invention, and enables to perform washing in which damage to the laundry is minimized as the user determines detergent, and a cycle temperature with reference to such matters to be attended to.

In the meantime, the washing method in accordance with the second preferred embodiment of the present invention is not simply limited to giving a notice on the information on matters to be attended to only.

That is, though not shown, if the washing apparatus enables introduction of a plurality of kinds of detergent, as well as automatic control of operation of each cycle with reference to information on the matters to be attended to retrieved thus by the control unit 370, the washing apparatus can perform a washing cycle by automatic control without giving the user a notice on the matters to be attended to.

Of course, in this case, an operation the user may not desire can be set.

Therefore, what is required is, not the simple retrieval and display of the matters to be attended to, or setting of operation of entire cycle by the control unit, but making that a washing intended by the user can be performed.

According to this, a washing method in accordance with a third preferred

embodiment of the present invention suggests providing the user with recommendable information on setting operation of each cycle, so that the user can set the operation of each cycle, more smoothly.

A washing method in accordance with the third preferred embodiment of the present invention will be described in more detail with reference to the flow chart in FIG. 6 attached hereto.

A process for obtaining information on properties of each piece of laundry introduced to an inside of the drum 320 is the same with the washing method in accordance with the foregoing first, or second preferred embodiment of the present invention.

That is, the control unit 370 obtains information on properties of the piece of laundry from each information tag 210 of the piece of laundry introduced to the inside of the drum 320 by using the reader unit 340 (S310).

In this instance, the information on properties preferably includes a material (for an example, composition of fiber) of the piece of laundry, and more preferably further includes at least one kind of information selected from information on a cycle temperature, information on usable detergent, and information on viability of using bleaching agent.

In the middle, or finish of obtaining the information on properties of each piece of laundry, the control unit 370 retrieves recommendable information for setting operation of each cycle from information stored in the memory 380 with reference to information on properties of a plurality of pieces of laundry obtained thus (S320).

The retrieval of the information is made by obtaining information stored in a state to be in correspondence to material (or properties) of a relevant piece of laundry among recommendable information on properties of each piece of laundry stored in the memory 380 for setting operation of each cycle.

For an example, if the material of the piece of laundry determined is a natural cellulose fiber, information on operation is retrieved from the memory 380, in which a

washing cycle is performed at a temperature below 40°C.

Upon finishing retrieval of the recommendable information, the recommendable information retrieved thus is displayed on the display unit 350, so that the user can set operation of each cycle, more smoothly (S330).

In the meantime, in the foregoing washing methods in the second, and third preferred embodiments of the present invention, the information on properties of laundry is not limited only to information on material of laundry, necessarily.

That is, a setting may be made such that matters to be attended to can be provided, or recommendable information can be provided for setting operation of each cycle in view of main use of the laundry for each piece of laundry.

For an example, if the main use of the laundry is working clothes, determining that oily contamination occurs mostly, by providing the user with matters to be attended to, or recommendable information for setting a cycle (washing at a high temperature, and so on), at the time of oily contamination, the user can wash the laundry smoothly.

[Industrial Applicability]

Since one mode of the present invention is washing apparatus and washing method which enable to take information on laundry that is liable to be left out into account exactly, the present invention has industrial applicability.

Since another mode of the present invention is washing apparatus and washing method which enable a user to washing laundry by using information on properties of the laundry smoothly, the present invention has industrial applicability.